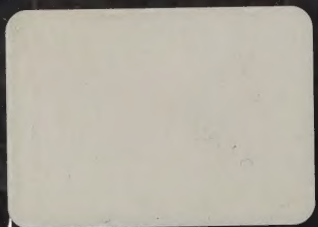


MP MASTER



MA34654



OPERATING INFORMATION

Combination Oscillographs

MODELS BL-221 AND BL-222

DESCRIPTION

The Model BL-221 and Model BL-222 Combination Oscillographs offer the choice of either direct ink recording or electric stylus recording. Basically, the BL-221 and BL-222 are similar to the Models BL-201 and BL-202 Direct Inking Oscillographs with some minor mechanical and electrical alterations, and the addition of electrical styluses, electro-sensitive paper and the Model BL-944 Power Supply. Schematic diagrams of the BL-944, BL-221 and BL-222 appear on the reverse side of this instruction sheet.

In electrical recording, an energized metallic stylus turns the paper dark at the point of contact. The BL-944 Power Supply provides the voltage for this stylus. The power supply requires a 105-120 volt, 60 cycle source. The power connection is made by cord on the back of the case. The chart drive motor of the oscillograph is connected to a source of the same voltage and frequency by the power cable provided for it and the two-contact connector on the back of the instrument. Oscillograph, power supply, and amplifier, or other source of the signal to be recorded, are then linked by the double cable, or cables, supplied with the oscillograph. The eight-contact female connector of the cable goes to the eight-prong male connector on the back plate of the oscillograph; the eight-prong cable plug goes to the power supply and the four-prong plug to the signal source. These connections are made in duplicate for the double-channel BL-222. In the case of the single channel BL-221, either output of the power supply may be used to connect it to the oscillograph.

CAUTION: While connections are being made, On-Off switches of both the power supply and the oscillograph should be at the Off position. And once the instruments are turned on, electric stylus assemblies should NOT be touched, since there will be a 100 to 300 volts difference in potential between pen and case.

The same support serves for mounting either the electric stylus (Model BL-942) or the inking pen (Model BL-915). It is reached by removing the metal cover at the base of the pen. When the electric stylus is installed, the inkwell is removed and the pin at the end of the stylus tube is inserted in the pin jack mounted at the top of the back plate of the oscillograph. Either of the twin jacks may be used for the stylus of the BL-221 but each stylus of the BL-222 should be connected to the jack on its own side of the oscillograph. Stylus pressure should lie within the range of one to one and one-half grams.

OPERATION

Operating procedure for the BL-221 and BL-222 oscillographs is in general similar to that for direct inking oscillographs, as given in Section II of this oscillograph manual. However, while inking pens trace uniformly regardless of velocity of the pen tip, the darkening effect of the electric stylus is dependent on two related factors: first, the velocity (or frequency) at which the stylus is being driven; second, but to a lesser extent, the speed of the chart paper itself.

At very slow speeds, the danger of burning the paper arises. And at very high speeds, the trace may be so light as to be hardly readable. For this reason two Hi-Lo toggle switches are mounted on the power supply. Snapping one of these switches to "Hi" increases voltage on the corresponding stylus tip and darkens the otherwise faint trace at high operating velocities. With the switch at "Lo", stylus current is decreased to prevent too dark a trace at low velocities. A moment's experimentation will determine the correct switch position for any particular combination of stylus velocity and chart speed.

Changing the BL-221 or BL-222 oscillographs from electric stylus to direct inking is a simple matter of disconnecting, or merely turning off the power supply, removing the electrical stylus and paper, and installing the direct inking pen, inkwell and direct inking chart paper. Operation then follows procedure given in Section II for the BL-201 and BL-202 Oscillographs.

NOTE: When a switch is made from direct inking to electrical recording or vice versa, frequency response of the amplifier should be reset for linearity at 20 and 80 cycles.

CONVERSION OF A BL-201 OR BL-202

With some exceptions, BL-201 and BL-202 Oscillographs can be converted to combination oscillographs like the BL-221 and BL-222. This conversion can be done at the Brush Development Co. factory without additional charge over the cost of the conversion kit. Schematic diagrams on the back of this instruction sheet are provided for owners of BL-201's and BL-202's who might wish to make the conversion themselves. Before this is attempted, the serial number of the penmotor or penmotors of the instruments should be noted. The conversion to electric stylus recording CANNOT be made in the case of a Model BL-902 Penmotor, if the serial number is lower than #1465, nor in the case of a Model BL-902A Penmotor, if the serial number is lower than #5596. In these older penmotors, one side of the coil is grounded to the pen mounting yoke. The d-c voltage the stylus tip receives from the power supply would burn out the coil. However, BL-902 and BL-902A Penmotors with other serial numbers than those specified above, and all BL-943 and BL-943A Penmotors, can be used for electric stylus as well as direct inking pen recording.

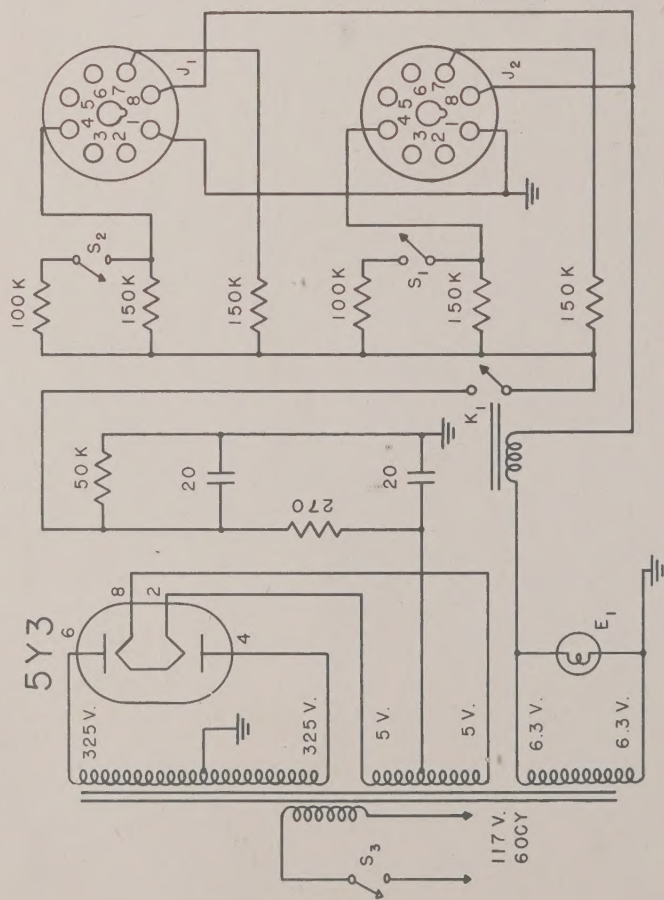


FIGURE 1.

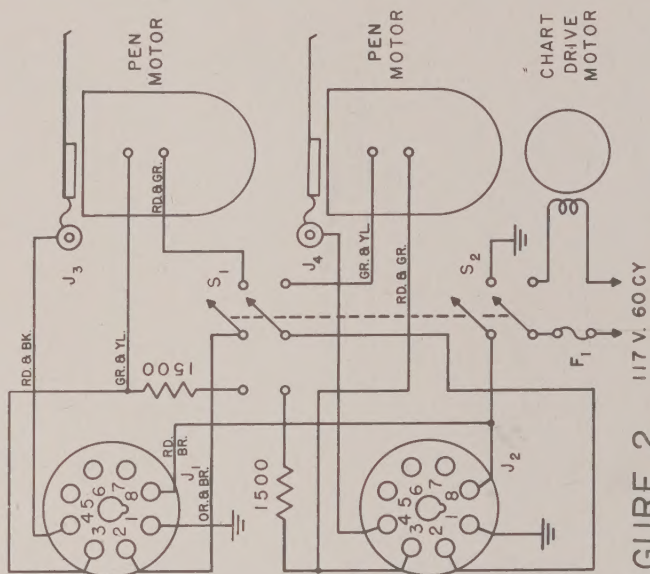


FIGURE 2. 117 V. 60 CY

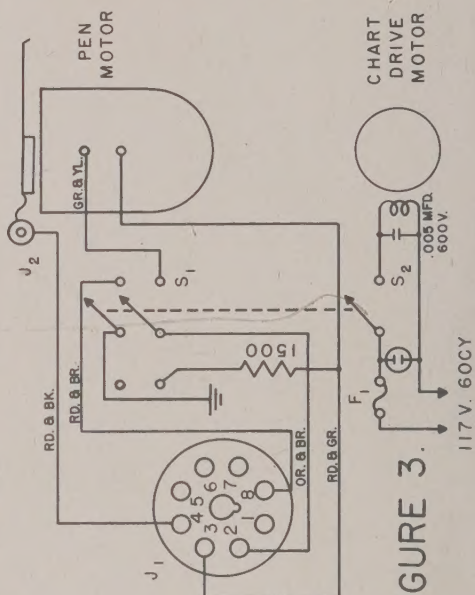


FIGURE 3.

1. MODEL BL-944 POWER SUPPLY
2. MODEL BL-222 COMBINATION MAGNETIC OSCILLOGRAPH (DOUBLE CHANNEL)
3. MODEL BL-221 COMBINATION MAGNETIC OSCILLOGRAPH (SINGLE CHANNEL)

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